



Research Brief for Resource Managers

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How to Manage for Resilience During Climate Change?

Greiner, S. Michelle, Kerry E. Grimm, and Amy E.M. Waltz. 2020. *Managing for resilience? Examining implications of resilience in Southwestern National Forests*. *Journal of Forestry*. 11pp. [DOI: 10.1093/jofore/fvaa006](https://doi.org/10.1093/jofore/fvaa006)

Making lands resilient to climate change has become a legal mandate for US Forest Service land planners (2012 USFS Planning Rule). However, interpreting and applying the directive is challenging because the term “resilience” is rather vague. It is diluted by a variety of definitions in the literature, as well as executed differently in diverse ecosystems by a variety of specialists.

To better grasp how USFS staff interpreted and applied the directive, twenty-six Southwestern Region USFS planners and managers were interviewed for 30-60 minutes each. The semi-structured interviews were then coded to identify themes and trends. Overall, inductive content analysis of the coded interview data showed that the interviewees had three main areas of concern over the difficulty in reporting and implementing the resilience directive: 1) definitions and scale, 2) flexibility and specificity, and 3) the resilience to climate change paradox.

Most of the interviewees relied on the *ecological resilience* definition of resilience, i.e. “the capacity of a system to absorb disturbance and reorganize while undergoing change so as to still retain essentially the same function, structure, identity, and feedbacks”. This definition is problematic in practice because it omits considerations of time, space, and levels of biological organization and

Management Implications

- USFS directives and policy require planners to manage for “resilience;” an ambiguous term that creates confusion, especially in its implementation.
- This research suggests that collaborative learning among stakeholders (aka knowledge coproduction) would be a good way to develop context specific resiliency metrics and goals, making the term more useful by operationalizing it.
- Using a social-ecological resilience framework definition to clarify the meaning of resilience would allow adaptive capacity across scales (i.e., time, space, level of biological organization) while also emphasizing the human systems that are embedded in the ecological systems (e.g., WUI).

their cross-scale interactions. While planners appreciated the flexibility of the 2012 rule, without specific examples to illustrate the meaning of resilience, and no specifics in scale or metrics of evaluation, planners found it difficult to operationalize into a goal-oriented, managerial context. Finally, if restoration to historical reference conditions was central to a planner’s concept of ecosystem resilience, then there was a paradox when it came to climate change: it did not

make sense how the directive to manage ecosystems to be more like the past could work in the face of uncertain future disturbance conditions with climate change.

To address the main concerns of these 26 USFS interviewees, Greiner et al. (2020) recommend using the **social-ecological resilience framework** definition of resilience when collaborating with other stakeholders. Unlike other definitions (e.g., ecological resilience), this resilience framework allows adaptive capacity across scales (time, space, and levels of biological organization) so that the effects of disturbances can be addressed via “reorganization and adaptation, striking a balance between sustaining and developing amidst change.” Further, it elevates the importance of the social components of resilience (e.g., WUI land use, economics, politics, and culture) into management and planning.

The authors emphasize that although this research is a good foundation for understanding difficulties with implementing the concept of resilience from policy into management, the topic would be significantly improved via analogous research that includes a broader diversity of disciplines, regions, and demographics. They emphasize that this is especially important in order to execute meaningful land stewardship where the term “resilience” continues to permeate USFS management.